

Appl. No. 08/709,930
Response to Office Action mailed July 9, 2004
AMENDMENT UNDER 37 CFR 1.116 EXPEDITED PROCEDURE
EXAMINING GROUP

PATENT

Amendments to the Claims:

Please cancel claims 119-122 and 163; and please amend claims 164 and 165 as follows. The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. - 114. (Canceled)

115. (Original) A method for allowing a user to remotely control a movement of a surgical instrument having a tip, the method comprising the steps:

- a) establishing an original position of the surgical instrument tip;
- b) inputting a command provided by a user to move the surgical instrument in a desired direction relative to an object displayed on a display device;
- c) computing an incremental movement of the surgical instrument based on the command provided by the user and on the original position of the surgical instrument;
- d) moving the surgical instrument in the desired direction so that the surgical instrument tip always moves in a direction commanded by the user.

116. - 118. (Canceled)

119. - 122. (Canceled)

123. (Previously presented) The method of claim 115, further comprising:

- 1) providing a first articulate arm, a controller and an input device which receives input commands, the first articulate arm in electrical communication with the controller and the controller in electrical communication with the input device;

- 2) cutting at least one incision into a patient;

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3) attaching the surgical instrument to the first articulate arm, the surgical instrument having a shaft supporting the surgical instrument tip;

4) inserting said surgical instrument into the patient through the at least one incision such that a first portion of the shaft is outside the patient and a second portion of the shaft is inside the patient;

5) generating movement commands to move said surgical instrument in accordance with a surgical procedure being performed, wherein said first articulate arm moves said surgical instrument in accordance with the movement commands such that said first portion of the shaft and said second portion of the shaft move; and

6) removing the surgical instrument from the patient.

124. (Previously presented) The method of claim 123 wherein said surgical instrument is a grasper.

125. (Previously presented) The method of claim 123 wherein the surgical instrument is a cauterizer.

126. (Previously presented) The method of claim 123 wherein the surgical instrument is a cutting blade.

127. - 151. (Canceled/Not Entered)

161. (Previously presented) The method of claim 123, further comprising:
inputting the commands by moving a handle, the handle supported by an input linkage and having a sensor, wherein the surgical instrument comprises an articulable surgical instrument having a wrist joint coupling the shaft to the surgical instrument tip, wherein said first articulate arm moves said surgical instrument while the first portion of the shaft is outside the patient and the second portion of the shaft is inside the patient by rotating the shaft about an axis of the shaft, by translating the shaft along the axis of the shaft, and by articulating the wrist

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joint within the patient, the surgical instrument movement proportional with the handle movement; and

operating a joint coupling a first tip structure and a second tip structure of the surgical instrument by actuating the sensor of the handle.

162. (Previously presented) A medical robotic system, comprising:
a robotic arm;
a coupler that pivotally attaches to the arm;
an endoscopic surgical instrument that is held by said coupler; and
a controller having a handle, the controller in electrical communication with the robotic arm; and

wherein movement at the controller produces a proportional movement of the robotic arm and surgical instrument, and wherein said endoscopic surgical instrument is an articulable endoscopic surgical instrument; and

wherein the articulable surgical instrument comprises a shaft coupled to a surgical instrument tip by a wrist joint, the articulable surgical instrument insertable into a patient via an incision such that a first portion of the shaft is outside the patient and a second portion of the shaft is inside the patient; wherein the handle has a sensor and is supported by a linkage, wherein movement of the handle produces rotation of said first portion of the shaft and the second portion of the shaft about an axis of the shaft extending through the incision, translation of said shaft along the axis, and articulation of said wrist joint, and wherein actuation of the sensor of the handle produces operation of the surgical instrument tip.

163. (Canceled)

164. (Amended) The system of claim 163, A system that allows a user to control a movement of a surgical instrument, wherein the surgical instrument is coupled to a display device that displays an object, comprising:

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a mechanism that moves the surgical instrument, said mechanism having an original position and including a first linkage arm coupled to the surgical instrument and a first actuator which can rotate said first linkage arm and the surgical instrument in a plane perpendicular to a first axis, said first actuator being coupled to a linear actuator which can translate said first linkage arm along an axis parallel with the first axis;

an input device that receives a command to move the surgical instrument in a desired direction relative to the object displayed by the display device, wherein the input device having [[has]] a handle; and,

a controller that receives said command to move the surgical instrument in the desired direction, computes a movement of said mechanism based on said command and the original position of said mechanism so that the surgical instrument moves in the desired direction, and provides output signals to said mechanism to move said mechanism said computed movement to move the surgical instrument in the desired direction commanded by the user, and wherein movement at the input device producing produces a proportional movement of the surgical instrument.

165. (Amended) ~~The system as recited in claim 163,~~ A system that allows a user to control a movement of a surgical instrument, wherein the surgical instrument is coupled to a display device that displays an object, comprising:

a mechanism that moves the surgical instrument, said mechanism having an original position and including a first linkage arm coupled to the surgical instrument and a first actuator which can rotate said first linkage arm and the surgical instrument in a plane perpendicular to a first axis, said first actuator being coupled to a linear actuator which can translate said first linkage arm along an axis parallel with the first axis;

an input device that receives a command to move the surgical instrument in a desired direction relative to the object displayed by the display device; and,

a controller that receives said command to move the surgical instrument in the desired direction, computes a movement of said mechanism based on said command and the original position of said mechanism so that the surgical instrument moves in the desired

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direction, and provides output signals to said mechanism to move said mechanism said
computed movement to move the surgical instrument in the desired direction commanded by
the user; wherein said controller comprises [[is]] a computer which receives input signals from
said input device and provides output signals to said controller to move the surgical instrument.